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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,536	05/08/2001	Jonathan Creasey	GJEL:0002/FLE SAH01509US	2589

7590 07/02/2004

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EXAMINER	
MISLEH, JUSTIN P	

ART UNIT	PAPER NUMBER
2612	5

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/851,536	CREASEY ET AL.	
	Examiner	Art Unit	
	Justin P Misleh	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 - 7 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 - 7 is/are rejected.

7)☒ Claim(s) 4 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08 May 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: An up-converting infrared-to-infrared CCD camera.

Claim Objections

3. **Claim 4** is objected to because of the following informalities: typographical error.

The preamble of Claim 4 states "A camera according to claims 1," which refers back to Claim 1 in plural form. The preamble of Claim 4 should be corrected to state, "A camera according to claim 1".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1 and 2** are rejected under 35 U.S.C. 102(b) as being anticipated by Howorth.

6. For **Claim 1**, Howorth discloses, as shown in figure 2 and as stated on pages 2 (lines 21 – 33), 3 (lines 1 – 13), 10 (lines 23 – 25), 11 (lines 1 – 8), and in the abstract, a camera (see figure 2) comprising a charge-coupled device (CCD), the CCD (26) having an anti-stokes phosphor (29) bound to the light receiving surface thereof (the phosphor 29 is coupled to the light receiving surface of the CCD 26 by means of fiber optics 25); and a housing surrounding the CCD (26) and defining an aperture through which, in use, light can pass and be received by the phosphor (29; a housing is inherent or else the camera would be rendered ineffective for picture taking).

The phosphor is anti-stokes because the phosphor is sensitive to infrared radiation and emits visible radiation. Infrared radiation comprises wavelengths ranging from 1 micron to 750 nanometers and visible radiation comprises wavelengths ranging from 750 nanometers to 400 nanometers. The radiation energy is directly proportional to the radiation frequency. Since, the radiation frequency is inversely proportional to the radiation wavelength, longer wavelengths have less energy and shorter wavelengths have more energy. The phosphor (29) absorbs infrared

radiation, which has longer wavelengths and less energy, and emits visible radiation, which has shorter wavelengths and more energy.

7. As for **Claim 2**, Howorth discloses, a camera (see figure 2) according to Claim 1, wherein the anti-stokes phosphor (29) is sensitive to light in the wavelength range of 1500 nm to 1610 nm.

As stated above, infrared radiation comprises wavelengths ranging from 1 micron to 750 nanometers, which fully incorporates 1500 to 1610 nanometers.

8. As for **Claim 4** (please see objection above), Howorth discloses, a camera (see figure 2) according to Claim 1, comprising at least one filter (image forming lens 21) positioned between the aperture (inherently provided) and the phosphor (29) on the CCD (26).

The image forming lens (21) focuses light onto the phosphor (29). The image forming lens (21) captures a limited field of view with respect to the three dimensional continuous environment that the camera is in when capturing images; therefore, the image forming lens (21) filters to the three dimensional continuous environment to form the capture field of view.

9. As for **Claim 7**, Howorth discloses, a camera according to Claim 1, wherein the phosphor (29) is bound to the CCD by an adhesive (optical cement 24). As stated in Claim 1, the phosphor (29) is bound to the CCD (26), wherein the phosphor (29) is coupled face-to-face via fiber optics (25) to the CCD (26) such that visible light emitted from the phosphor (29) is received by the CCD (26). The phosphor (29) is coupled to the fiber optics (25) by means of optical cement (24).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Howorth in view of Valdna et al.

12. As for **Claim 3**, Howorth discloses, that the phosphor (29) emits in the visible light range comprising wavelengths 750 nanometers to 400 nanometers. However, Howorth does not disclose wherein the phosphor (29) emits in the near infrared range comprising wavelengths ranging from 1100 nanometers to 800 nanometers and accordingly does not discloses emitting in the range of 950 nanometers to 1075 nanometers.

On the other hand, Valdna et al. also disclose a phosphor. More specifically, Valdna et al. disclose, as stated in columns 1 (lines 15 – 50) and 3 (lines 63 – 66), an improved phosphor having a peak emission in the red or near-infrared wavelength range. The near-infrared wavelength range comprises wavelengths ranging from 800 nanometers to 1100 nanometers, which includes the wavelength range 950 to 1075 nanometers. As stated in column 1 (line 15 – 32), at the time the invention was made, one with ordinary skill in the art would have been motivated to include a phosphor having a peak emission including wavelengths ranging from 950 nanometers to 1075 nanometers, as taught by Valdna et al. in the camera with phosphor, disclosed by Howorth, as a means for enabling the phosphor output to match the maximum quantum efficiency of the CCD while maintaining a low afterglow so as to achieve a high

dynamic range and minimize ghost images and streaking. Therefore, at the time the invention was made, it would have been obvious to one with ordinary skill in the art to include a phosphor having a peak emission including wavelengths ranging from 950 nanometers to 1075 nanometers, as taught by Valdna et al. in the camera with phosphor, disclosed by Howorth.

13. **Claims 5 and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Howorth in view of Ohwaki et al.

14. As for **Claim 5**, Howorth discloses a phosphor (29). However, Howorth does not disclose wherein the phosphor comprises ErYb in a host phosphor matrix.

On the other hand, Ohwaki et al. also disclose a phosphor. More specifically, Ohwaki et al. disclose, as stated in columns 4 (lines 43 – 54) and 6 (lines 33 – 47), a phosphor comprising ErYb in a host phosphor matrix. As stated in column 2 (lines 13 – 42), at the time the invention was made, one with ordinary skill in the art would have been motivated to include a phosphor comprising ErYb in a host phosphor matrix, as taught by Ohwaki et al., in the camera with phosphor, disclosed by Howorth, as means to provide a phosphor with a high conversion efficacy wherein the emitting intensity is not lowered. Therefore, at the time the invention was made, it would have been obvious to one with ordinary skill in the art to include a phosphor comprising ErYb in a host phosphor matrix, as taught by Ohwaki et al., in the camera with phosphor, disclosed by Howorth.

15. As for **Claim 6**, Ohwaki et al. disclose, as stated in column 4 (lines 43 – 54), that the phosphor may be comprised of rare earth ions and fluorides, oxyfluorides, and oxychlorides.

The claim language requires a host phosphor matrix comprising one of Y_2O_2S, YF_3, $NaYF_4$ and La_2O_2S. Yttrium Fluoride (YF_3) is a fluoride and therefore, Ohwaki et al. meets the claim.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following is a brief description of the cited prior art identified by label as shown on PTO-892:

- **Prior Art C** discloses a process for producing an infrared-to-infrared up-converting phosphor and advantages of doing so.
- **Prior Art D and E** both disclose a phosphor coated imager with various absorption and emission properties, however, the phosphors conform to Stoke's law.
- **Prior Art F** discloses a phosphor bound to a CCD by means of a fiber optic coupler wherein the phosphor does not conform to Stoke's law.
- **Prior Art G and H** both disclose re-radiation devices for absorbing infrared radiation and emitting infrared radiation onto an imager, without the use of phosphors.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Justin P Misleh whose telephone number is 703.305.8090. The Examiner can normally be reached on Monday through Thursday from 7:30 AM to 5:30 PM and on alternating Fridays from 7:30 AM to 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Wendy R Garber can be reached on 703.305.4929. The fax phone number for the organization where this application or proceeding is assigned is 703.872.9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
June 25, 2004

WENDY R. GARBER
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